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**Tzou et al.**

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- (54) **ELECTRONIC DEVICE WITH MULTI SCREENS**
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- (56) **References Cited**
- U.S. PATENT DOCUMENTS
- 7,864,514 B2 \* 1/2011 Lee ..... F16M 11/10 361/679.21
- 9,167,711 B2 \* 10/2015 Lee ..... G06F 1/1626
- (Continued)

- FOREIGN PATENT DOCUMENTS
- CN 101533295 9/2009
- TW 1653524 3/2019

- OTHER PUBLICATIONS
- “Office Action of Taiwan Counterpart Application”, dated Aug. 6, 2020, pp. 1-5.
- (Continued)

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(51) **Int. Cl.**  
**G06F 1/16** (2006.01)

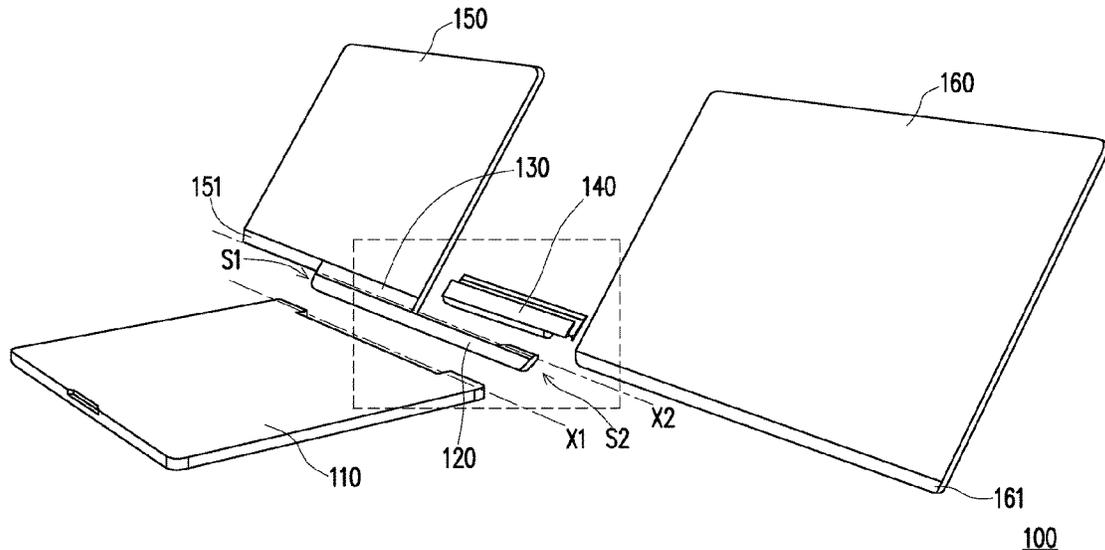
(52) **U.S. Cl.**  
CPC ..... **G06F 1/1647** (2013.01); **G06F 1/1624** (2013.01); **G06F 1/1681** (2013.01)

(58) **Field of Classification Search**  
CPC .... G06F 1/1647; G06F 1/1624; G06F 1/1681; G06F 1/1654; G06F 1/1649; G06F 1/1677; G06F 1/1616  
See application file for complete search history.

(57) **ABSTRACT**

An electronic device with multi screens including a host, a hinge module, a first connecting base, a second connecting base, a first screen, and a second screen is provided. The hinge module is pivotally connected to the host and rotates along a first axial direction. The first connecting base is fixed on a first side of the hinge module. The second connecting base is pivotally connected to a second side of the hinge module and rotates along a second axial direction parallel to the first axial direction. The second connecting base is adjacent to the first connecting base. The first screen is slidably disposed in the first connecting base and the second connecting base. The second screen is detachably disposed in the second connecting base. The second connecting base is suitable for rotating relative to the hinge module to be aligned with or separated from the first connecting base.

**22 Claims, 15 Drawing Sheets**



(56)

**References Cited**

U.S. PATENT DOCUMENTS

2008/0062625	A1*	3/2008	Batio .....	G06F 1/1615 361/679.29
2009/0102744	A1	4/2009	Ram	
2012/0162080	A1	6/2012	Cao	
2015/0212546	A1*	7/2015	Ram .....	G06F 1/1649 361/679.01
2018/0129252	A1*	5/2018	Oakley .....	G06F 1/1616
2019/0004568	A1	1/2019	Kaya et al.	

OTHER PUBLICATIONS

Office Action of China Counterpart Application, dated Jun. 25, 2021, pp. 1-6.

\* cited by examiner

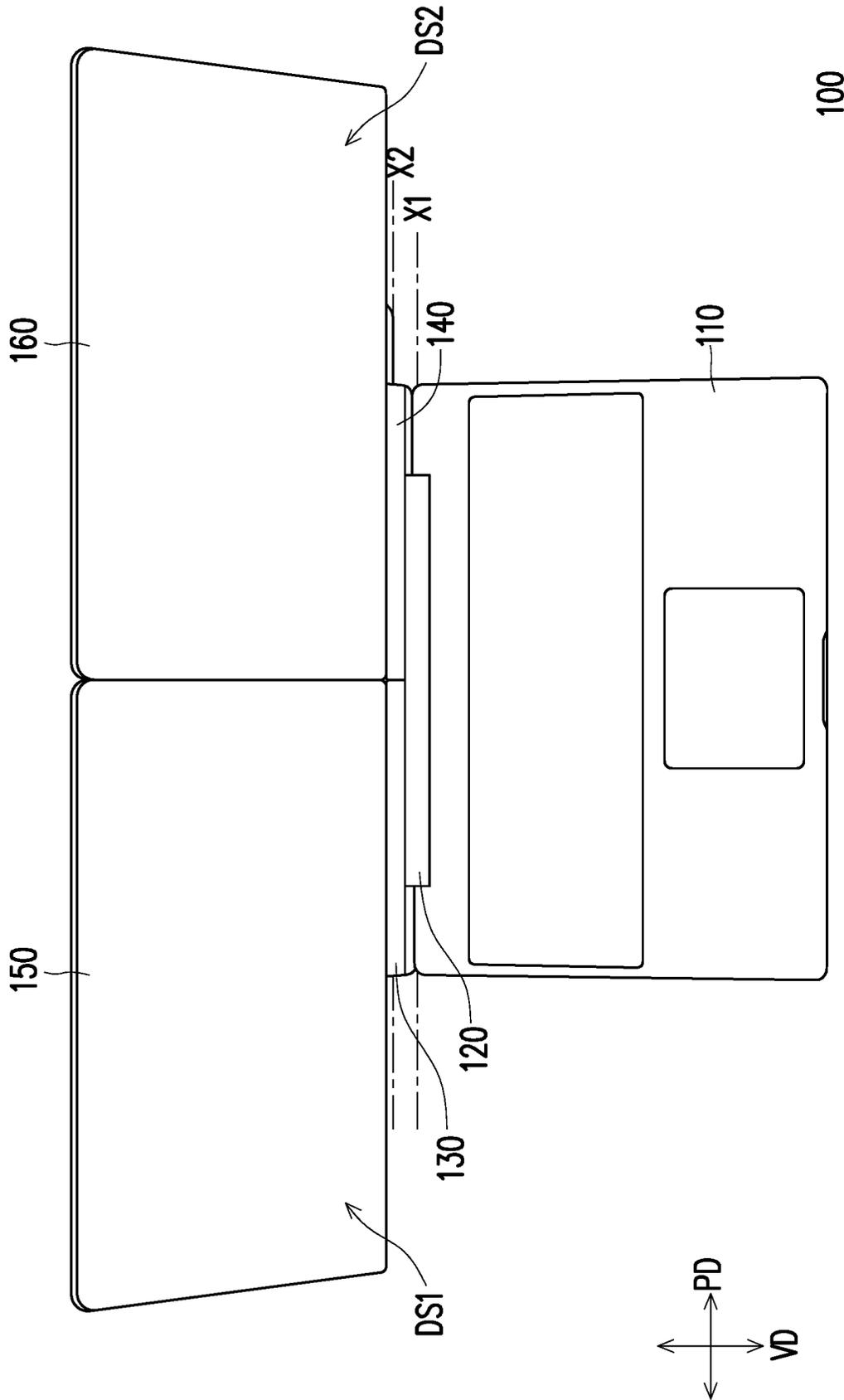


FIG. 1A



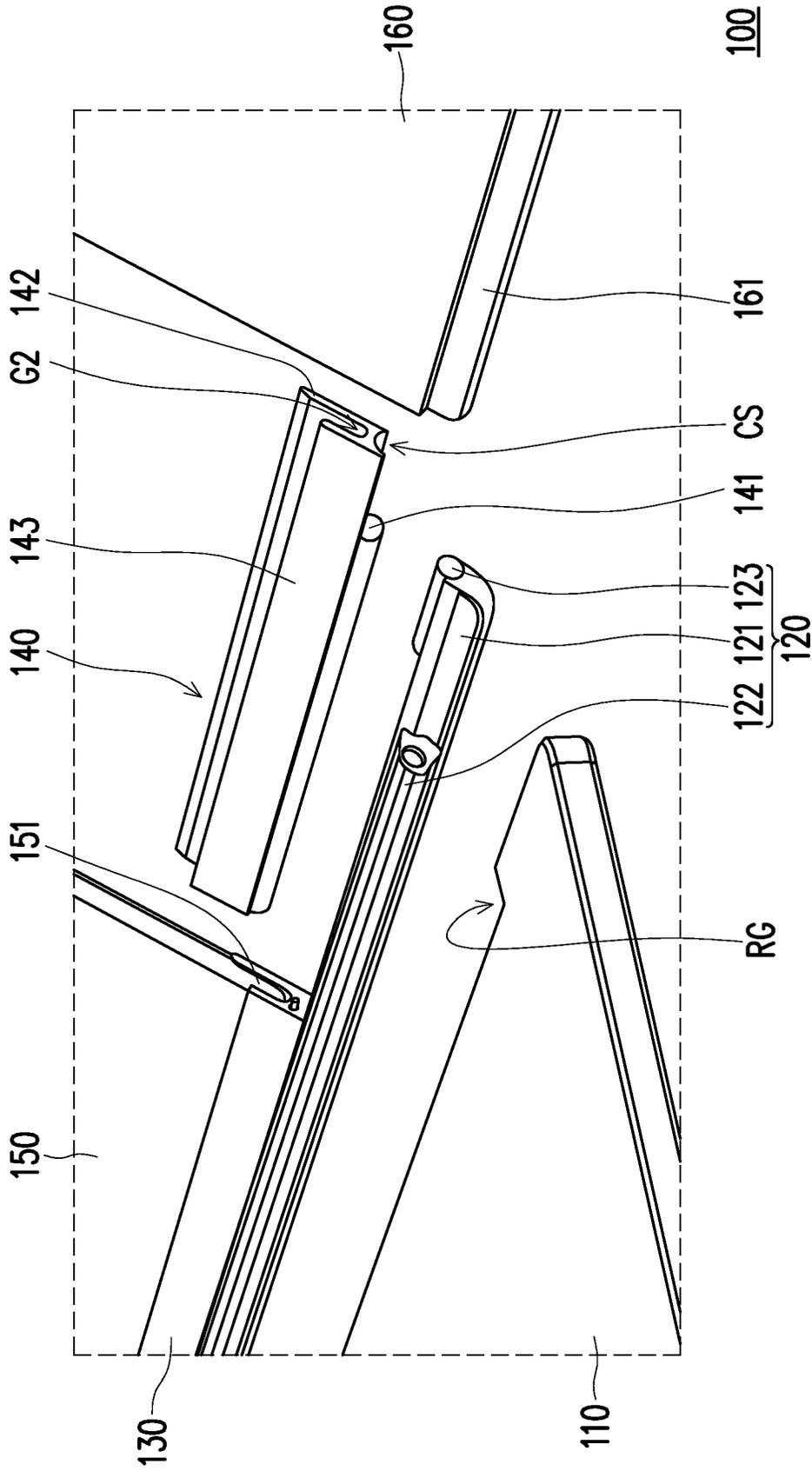
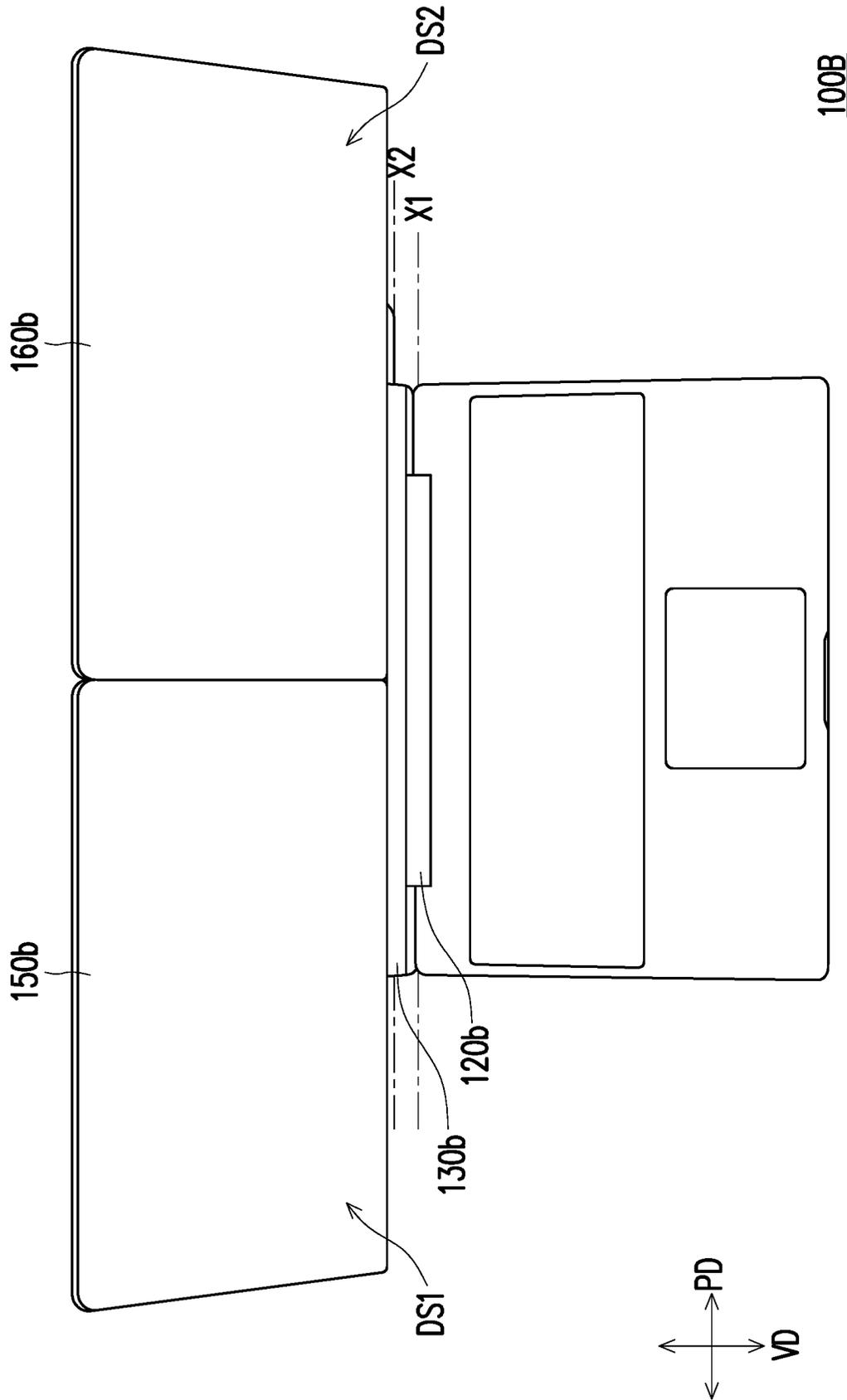


FIG. 1C



100B

FIG. 1D

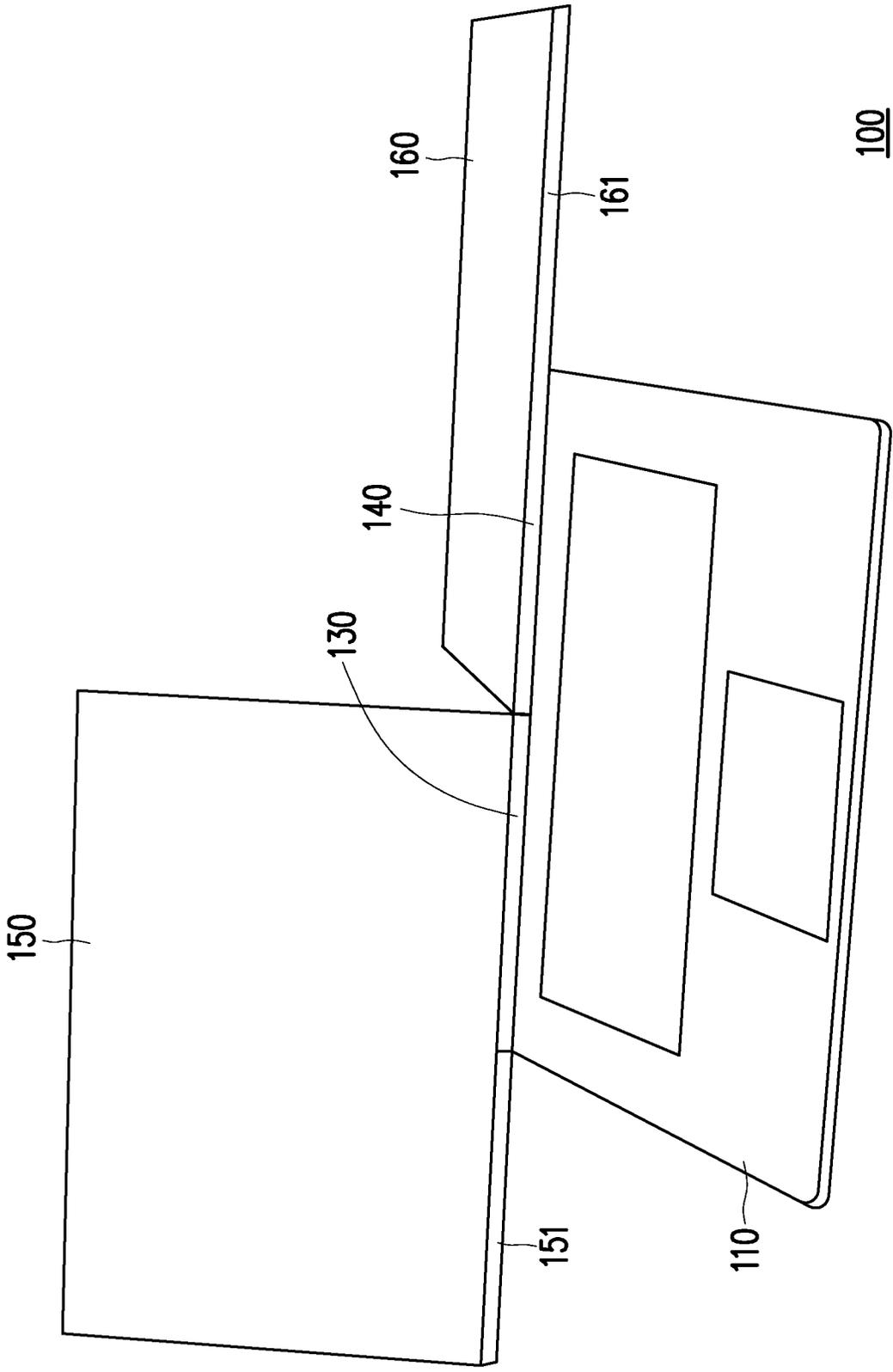


FIG. 2A

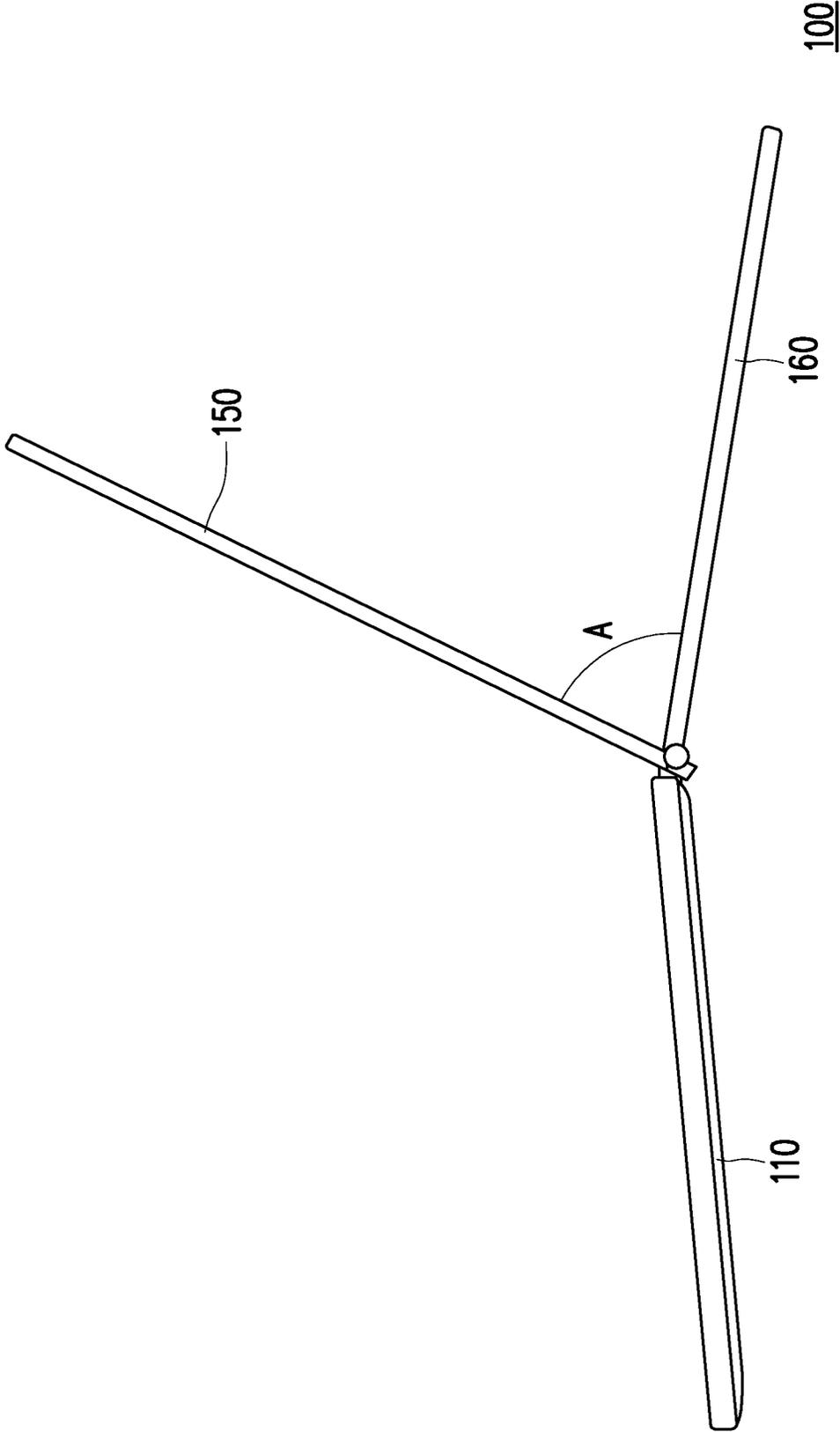


FIG. 2B

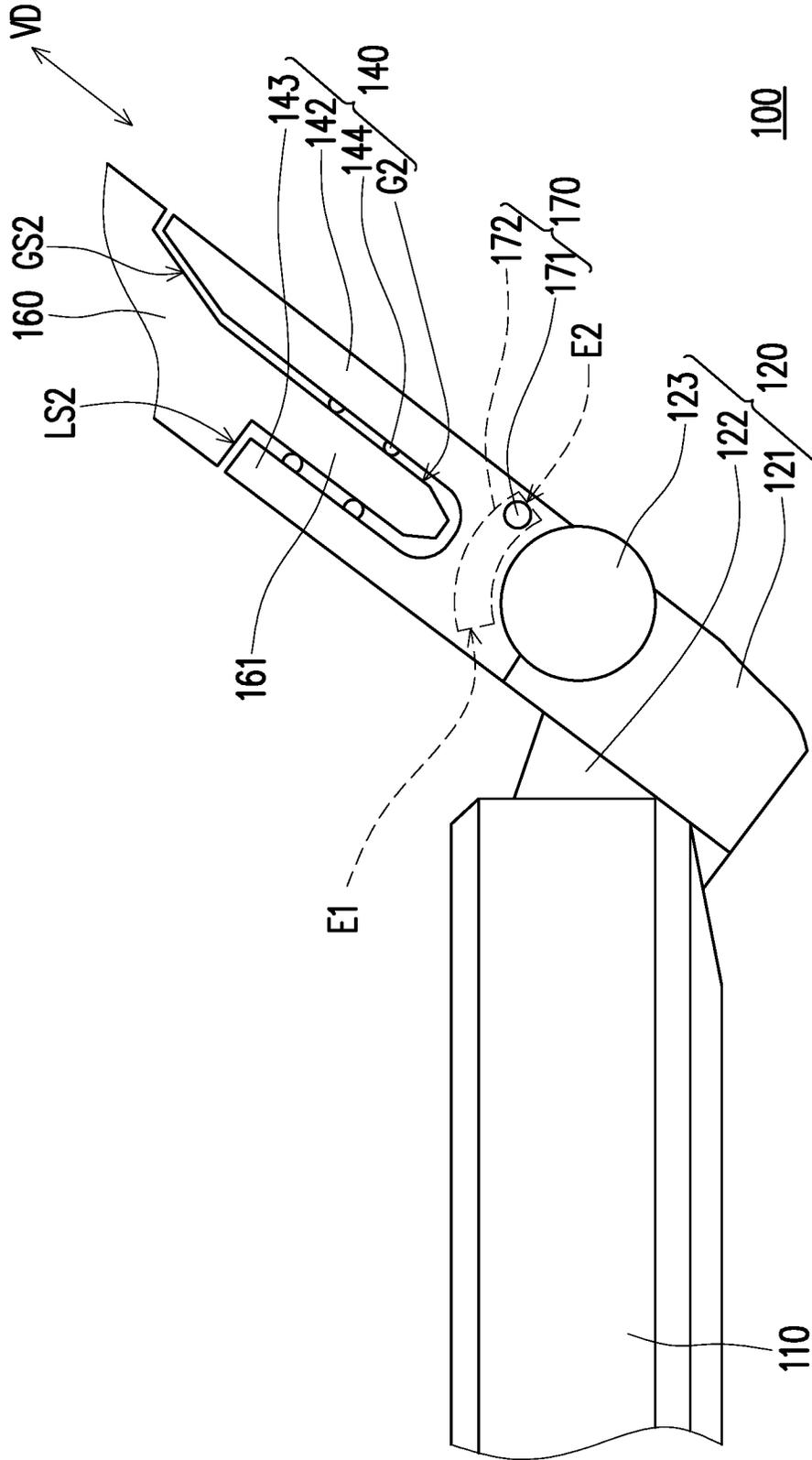


FIG. 2C



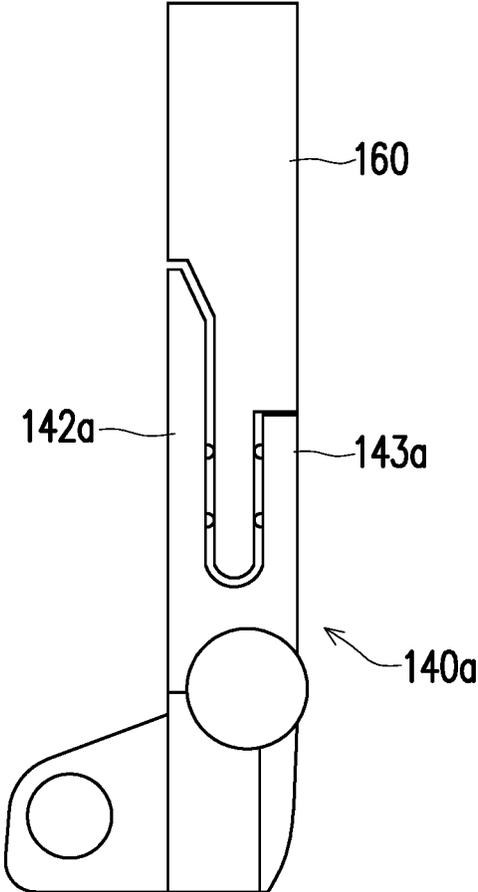


FIG. 2E

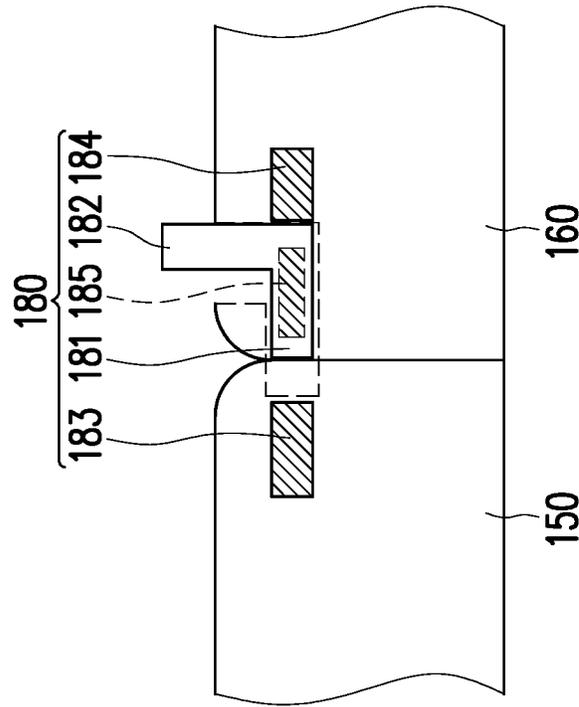


FIG. 3B

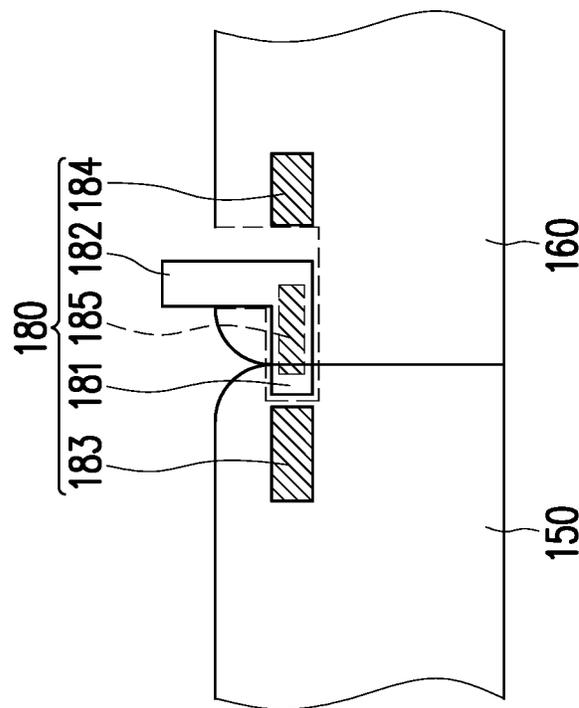


FIG. 3A

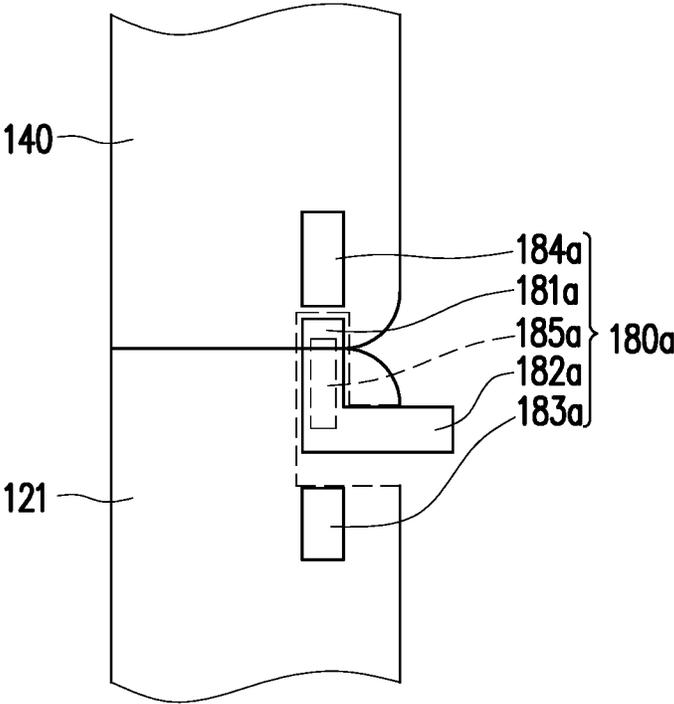


FIG. 3C

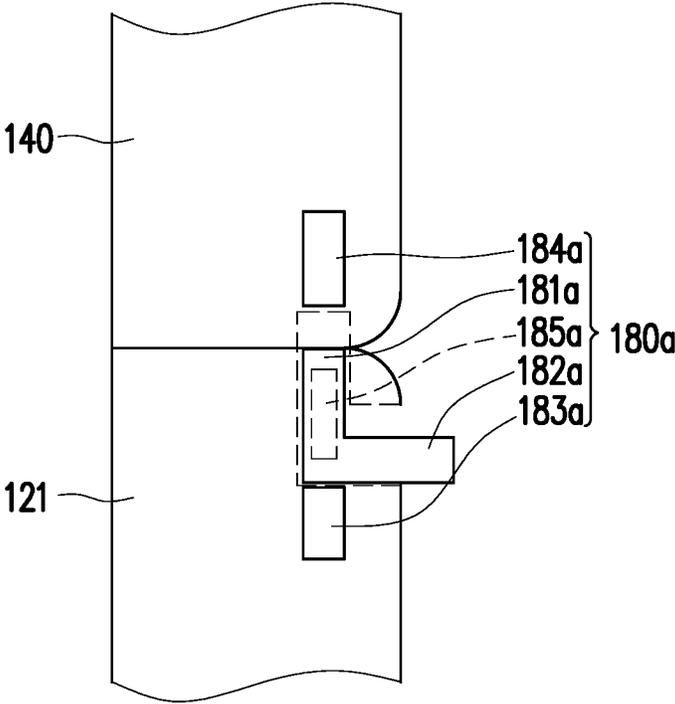


FIG. 3D

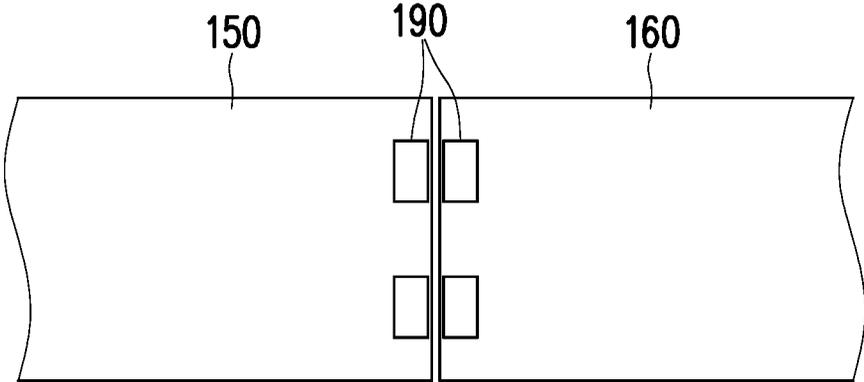


FIG. 3E

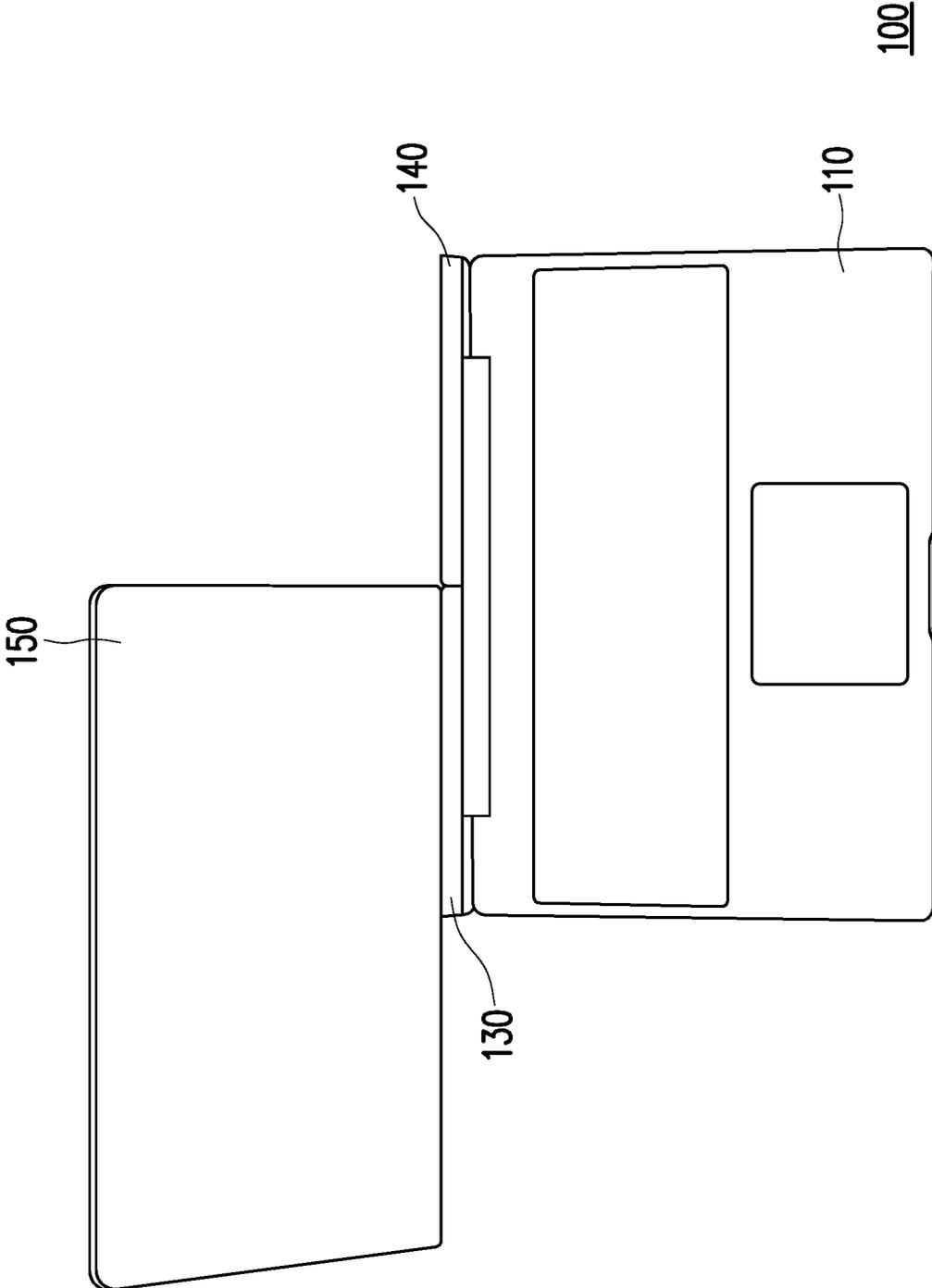
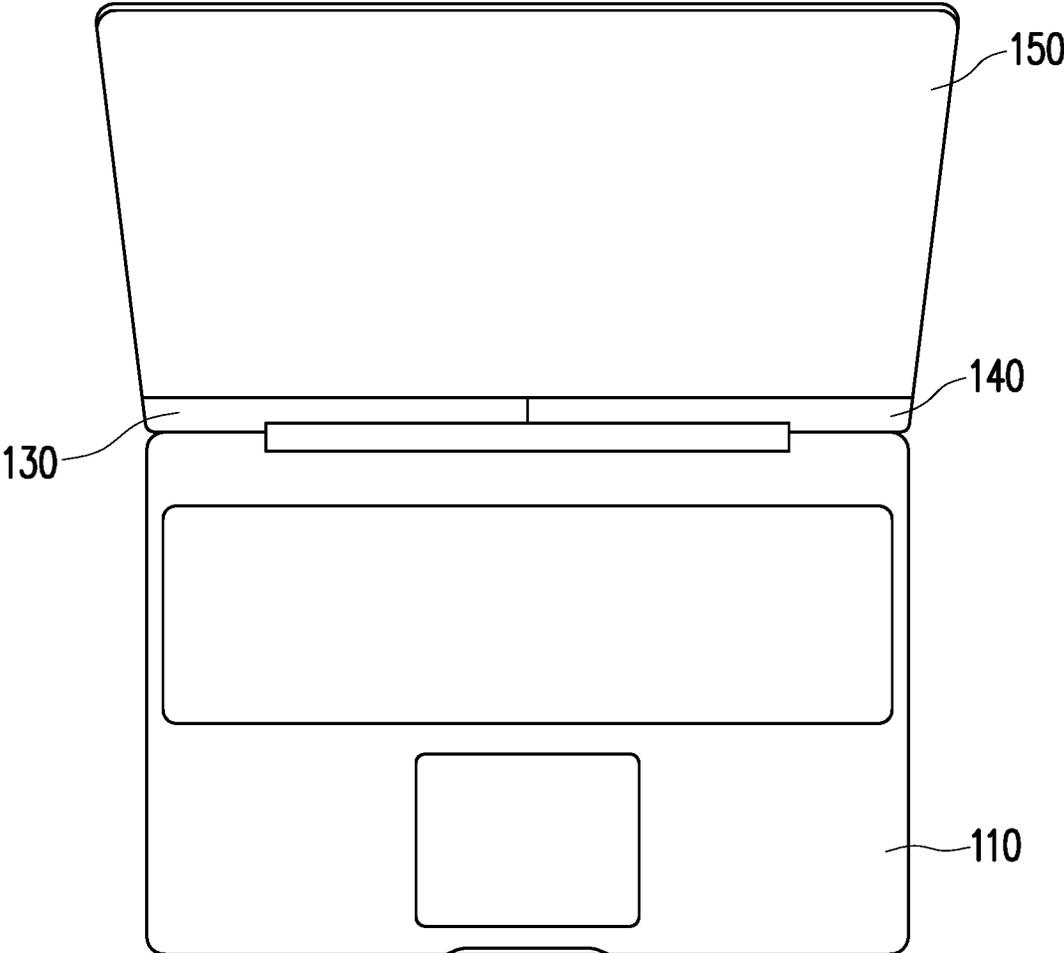


FIG. 4A



100

FIG. 4B

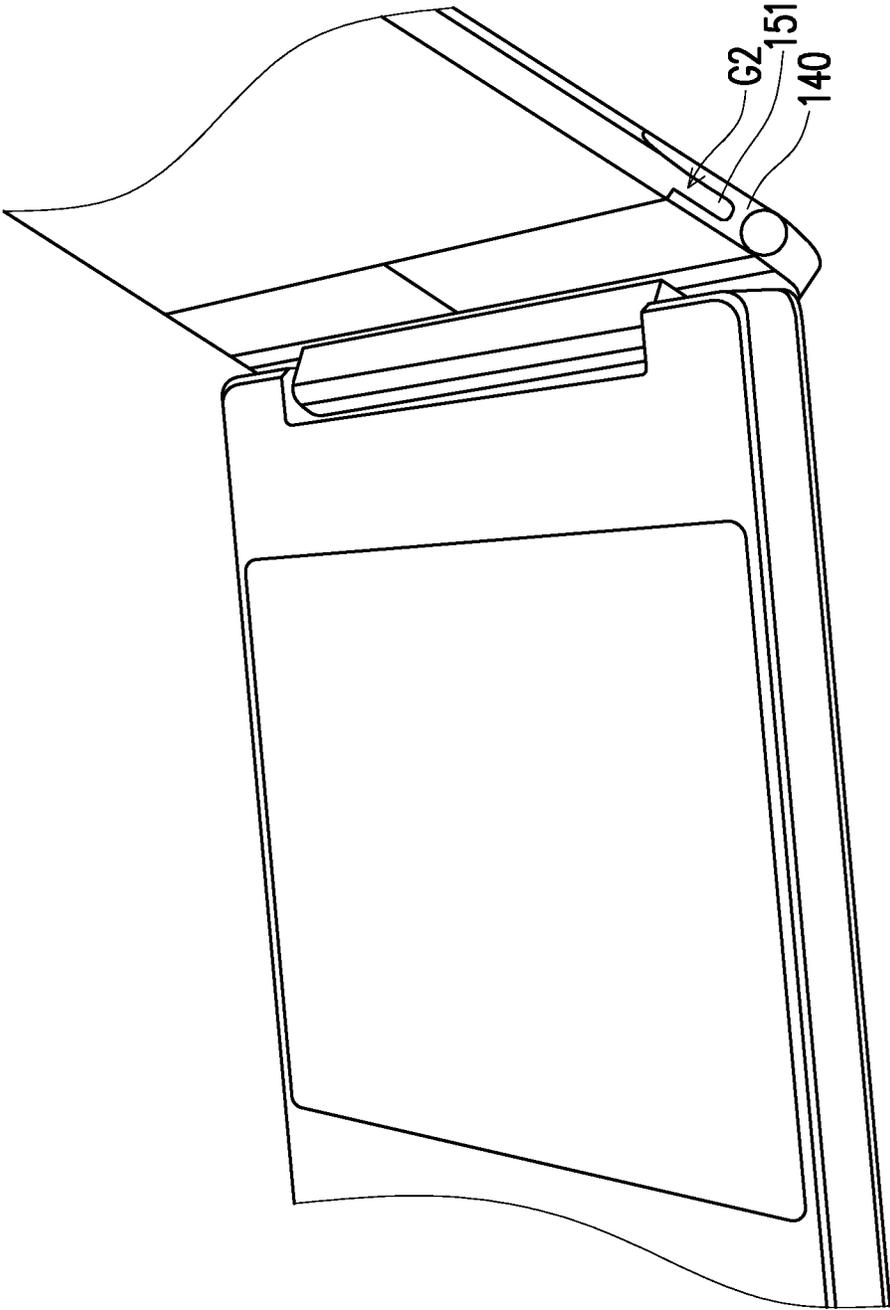


FIG. 4C

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**ELECTRONIC DEVICE WITH MULTI  
SCREENS****CROSS-REFERENCE TO RELATED  
APPLICATION**

This application claims the priority benefit of U.S. provisional application Ser. No. 62/810,915, filed on Feb. 26, 2019, and U.S. provisional application Ser. No. 62/836,742, filed on Apr. 22, 2019. The entirety of each of the above-mentioned patent applications is hereby incorporated by reference herein and made a part of this specification.

**BACKGROUND OF THE INVENTION**

## 1. Field of the Invention

The invention relates to an electronic device, and in particular, to an electronic device with multi screens whose screens may be used separately and in combination.

## 2. Description of Related Art

With the increase of the information processing amount, single-screen notebook computers can no longer meet requirements of users. There are two manners for an existing notebook computer to display a plurality of windows: One manner is to frequently switching windows, causing inconvenience in use, and causing low working efficiency, and the other manner is to zoom out a plurality of windows to be displayed on the screen at the same time. However, displaying a plurality of window at the same time causes display content to be extremely small, which is not easy to see clearly. Therefore, a notebook computer with a plurality of screens for displaying has been developed currently.

Existing multi-screen notebook computers are roughly classified into a built-in type and an add-on type. The built-in type is that a display end of the notebook computer has a plurality of screens, and has disadvantages of increasing the product thickness of the notebook computer and most cannot be used separately. The built-in type is mainly used for expanding the display area. The add-on type is that one side edge of the notebook computer is added with a screen, which easily causes a center-of-gravity shift of the notebook computer, and also deviates a visual angle of a user from the center. The add-on type does not conform to ergonomics.

**SUMMARY OF THE INVENTION**

The invention provides an electronic device with multi screens, including a first screen and a second screen that may be aligned with each other and separated from each other, so that when being aligned with each other, the first screen and the second screen help expand the display range, and when being separated from each other, the first screen and the second screen may be displayed in different directions to be not limited to be used by a single person.

An electronic device with multi screens of the invention includes a host, a hinge module, a first connecting base, a second connecting base, a first screen, and a second screen. The hinge module is pivotally connected to the host and rotates along a first axial direction. The first connecting base is fixed on one side of the hinge module. The second connecting base is pivotally connected to a second side of the hinge module and rotates along a second axial direction parallel to the first axial direction. The second connecting base is adjacent to the first connecting base. The first screen

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is slidably disposed in the first connecting base and the second connecting base. The second screen is detachably disposed in the second connecting base. The second connecting base is suitable for rotating relative to the hinge module to be aligned with or separated from the first connecting base. When the first connecting base and the second connecting base are aligned with each other, the first screen and the second screen are flush with each other, and when the first connecting base and the second connecting base are separated from each other, the first screen and the second screen includes an included angle therebetween.

An electronic device with multi screens of the invention includes a host, a hinge module, a first connecting base, a second connecting base, a first screen, and a second screen. The hinge module is pivotally connected to the host and rotates along a first axial direction. The first connecting base is fixed on one side of the hinge module. The second connecting base is pivotally connected to a second side of the hinge module and rotates along a second axial direction parallel to the first axial direction. The second connecting base is adjacent to the first connecting base. The first screen is slidably disposed in the first connecting base and the second connecting base. The second screen is detachably disposed in the second connecting base. The second connecting base is suitable for rotating relative to the hinge module to be aligned with the first connecting base, so that the first screen and the second screen are flush with each other, and the first display surface and the second display surface are located on a same plane.

An electronic device with multi screens of the invention includes a host, a hinge module, a connecting base, a first screen, and a second screen. The hinge module is pivotally connected to the host and rotates along a first axial direction. The connecting base is fixed on the hinge module. The first screen is slidably disposed in the connecting base and includes a first display surface. The second screen is detachably disposed in the connecting base and includes a second display surface. The first screen and the second screen are flush with each other, and the first display surface and the second display surface are located on a same plane.

Based on the above, the electronic device with multi screens of the invention includes the first screen and the second screen that may be aligned with each other and separated from each other, so that when being aligned with each other, the first screen and the second screen may be displayed in combination to increase the display range of a single visual angle, and when being separated from each other, the first screen and the second screen may be respectively displayed in different visual angles to be applicable to situations of discussions of a plurality of persons. Further, the first connecting base and the second connecting base are disposed on two sides of the hinge module, so that the first screen and the second screen are located at the center of the host. In this way, disadvantages of causing a center-of-gravity shift and deviating a visual angle from the center can be avoided. Therefore, the electronic device with multi screens of the invention more conforms to ergonomics.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1A is a schematic top view of a combination mode of an electronic device with multi screens according to an embodiment of the invention.

FIG. 1B is a schematic exploded view of components of the electronic device with multi screens in FIG. 1A.

FIG. 1C is a schematic enlarged view of some components of the electronic device with multi screens in FIG. 1B.

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FIG. 1D is a schematic top view of a combination mode of an electronic device with multi screens according to another embodiment of the invention.

FIG. 2A is a schematic three-dimensional view of a separation mode of the electronic device with multi screens in FIG. 1A.

FIG. 2B is a schematic side view of the electronic device with multi screens in FIG. 2A.

FIG. 2C is a schematic diagram of a rotating stroke of the electronic device with multi screens in FIG. 1A.

FIG. 2D is a schematic diagram of a rotating stroke of the electronic device with multi screens in FIG. 2A.

FIG. 2E is a schematic connection diagram of a second connecting base and a second screen according to another embodiment of the invention.

FIG. 3A is a schematic action diagram of a locking structure of the electronic device with multi screens in FIG. 2A locking a first screen and a second screen.

FIG. 3B is a schematic action diagram of the locking structure of the electronic device with multi screens in FIG. 3A being unlocked on the first screen and the second screen.

FIG. 3C is a schematic action diagram of the locking structure of the electronic device with multi screens in FIG. 2A locking a hinge module and a second connecting base.

FIG. 3D is a schematic action diagram of the locking structure of the electronic device with multi screens in FIG. 3C being unlocked on the hinge module and the second connecting base.

FIG. 3E is a schematic planar diagram of the electronic device with multi screens in FIG. 1A adopting a plurality of positioning magnets.

FIG. 4A is a schematic top view of the electronic device with multi screens in FIG. 1A discounting the second screen.

FIG. 4B is a schematic top view of a first screen of the electronic device with multi screens in FIG. 1A being clamped between a first connecting base and a second connecting base.

FIG. 4C is a partial schematic enlarged three-dimensional view of the electronic device with multi screens in FIG. 4B.

### DESCRIPTION OF THE EMBODIMENTS

FIG. 1A is a schematic top view of a combination mode of an electronic device with multi screens according to an embodiment of the invention. FIG. 1B is a schematic exploded diagram of components of the electronic device with multi screens in FIG. 1A. FIG. 1C is a schematic enlarged diagram of some components of the electronic device with multi screens in FIG. 1B.

Referring to FIG. 1A to FIG. 1C, the electronic device with multi screens **100** of the invention includes a host **110**, a hinge module **120**, a first connecting base **130**, a second connecting base **140**, a first screen **150**, and a second screen **160**.

The host **110** is configured to carry components such as a storage unit, a logical unit, a power supply unit, a transport unit, and an input unit. The hinge module **120** is pivotally connected to the host **110** and rotates along a first axial direction **X1**. The first connecting base **130** is fixed on one side **S1** of the hinge module **120**, namely, the first connecting base **130** and the hinge module **120** are of an integrally formed structure. The second connecting base **140** is pivotally connected to a second side **S2** of the hinge module **120** and rotates along a second axial direction **X2** parallel to the first axial direction **X1**. The second connecting base **140** is adjacent to the first connecting base **130**.

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Briefly, the first connecting base **130** and the second connecting base **140** may respectively rotate along the first axial direction **X1** and the second axial direction **X2**, to achieve the effect of separating from each other.

The first screen **150** is slidably disposed in the first connecting base **130** and the second connecting base **140**. Besides, the first screen **150** is suitable for sliding along a horizontal direction **PD** relative to the first connecting base **130**, so that the first screen **150** may partially protrude beyond the first connecting base **130** or be aligned to be folded on the first connecting base **130** and the second connecting base **140**. In addition, the first screen **150** is clamped at the first connecting base **130** by using a clamping structure (not shown in the figure). Therefore, the first screen **150** cannot be taken down from the first connecting base **130**.

The second screen **160** is detachably disposed in the second connecting base **140**. Further, the second screen **160** is slidably disposed in the second connecting base **140** to be adjacent to the first screen **150**, and the first screen **150** and the second screen **160** are suitable for switching to a synchronous display mode or an individual display mode. When switching to the synchronous display mode, the first screen **150** and the second screen **160** display a same picture in combination, to expand the display range accordingly. When switching to the individual display mode, the first screen **150** and the second screen **160** respectively output different pictures, to achieve the effect of separated display accordingly.

FIG. 2A is a schematic three-dimensional view of a separation mode of the electronic device with multi screens in FIG. 1A. FIG. 2B is a schematic side view of the electronic device with multi screens in FIG. 2A. FIG. 2C is a schematic diagram of a rotating stroke of the electronic device with multi screens in FIG. 1A. FIG. 2D is a schematic diagram of a rotating stroke of the electronic device with multi screens in FIG. 2A. FIG. 2E is a schematic connection diagram of a second connecting base and a second screen according to another embodiment of the invention.

Referring to FIG. 2A to FIG. 2D, the second connecting base **140** is suitable for rotating relative to the hinge module **120** along the second axial direction **X2** to be aligned with or separated from the first connecting base **130**. When the first connecting base **130** and the second connecting base **140** are aligned with each other, the first screen **150** and the second screen **160** are flush with each other and switch to the synchronous display mode. When the first connecting base **130** and the second connecting base **140** are separated from each other, the first screen **150** and the second screen **160** include an included angle **A** therebetween and switch to the individual display mode.

After the electronic device with multi screens **100** switches to the individual display mode, the first screen **150** and the second screen **160** may be respectively displayed in different directions, which is suitable for users in different directions to watch, and the second screen **160** may further provide use manners such as touch control and writing.

Referring to FIG. 1A to FIG. 1C, the hinge module **120** includes a support portion **121**, a first rotating shaft portion **122**, and a pivot portion **123**. The first rotating shaft portion **122** is disposed on one side of the support portion **121** facing the host **110** and located in a rotating groove **RG** of the host **110**, and the first rotating shaft portion **122** is rotatably connected to two rotating portions **111** of the host **110**. The pivot portion **123** is disposed on the other side **S2** of the support portion **121** and spaced from the first connecting base **130**.

Referring to FIG. 2A to FIG. 2C, the second connecting base **140** includes a second rotating shaft portion **141** and a lower curved surface CS. The second rotating shaft portion **141** is pivotally connected to the pivot portion **123** of the hinge module **120** and the lower curved surface CS partially accommodates the pivot portion **123**. When the second connecting base **140** rotates along the second axial direction X2, the lower curved surface CS is suitable for sliding on the pivot portion **123**. Through the concave-convex matching of the lower curved surface CS and the pivot portion **123**, the effect of guiding the second connecting base **140** to rotate can be achieved.

Referring to FIG. 1C, FIG. 2C, and FIG. 2D, the first connecting base **130** includes a first guide wall **131**, a first limiting wall **132**, a first groove G1, and a plurality of first protrusions **133**. The first groove G1 is formed between the first guide wall **131** and the first limiting wall **132**. The first screen **150** includes a first clamping portion **151**, a first guide surface GS1, and a first limiting surface LS1. The first clamping portion **151** is clamped in the first groove G1, and the first guide surface GS1 and the first limiting surface LS1 respectively abut against the first guide wall **131** and the first limiting wall **132**. A plurality of first protrusions **133** are respectively formed on the first guide wall **131** and the first limiting wall **132** and located in the first groove G1, and each first protrusion **133** interferes with and limits the first clamping portion **151** of the first screen **150**, to avoid shaking of the first screen **150** in the first connecting base **130**.

Specifically, an extended length L of the first guide wall **131** relative to the hinge module **120** is greater than an extended length L of the first limiting wall **132** relative to the hinge module **120**. Referring to FIG. 2D, in the present embodiment, the first limiting wall **132** is formed on one side of the first connecting base **130** close to the host **110** and the first guide wall **131** is formed on one side of the first connecting base **130** away from the host **110**. In other embodiments, the first limiting wall is, for example, formed on one side of the first connecting base away from the host and the first guide wall is formed on one side (not shown in the figure) of the first connecting base close to the host.

The second connecting base **140** includes a second guide wall **142**, a second limiting wall **143**, a second groove G2, and a plurality of second protrusions **144**. The second groove G2 is formed between the second guide wall **142** and the second limiting wall **143**. The second screen **160** includes a second clamping portion **161**, a second guide surface GS2, and a second limiting surface LS2. The second clamping portion **161** is clamped in the second groove G2, and the second guide surface GS2 and the second limiting surface LS2 respectively abut against the second guide wall **142** and the second limiting wall **143**. A plurality of the second protrusions **143** are respectively formed on the second guide wall **142** and the second limiting wall **143** and located in the second groove G2, and each second protrusion **143** interferes with and limits the second clamping portion **161** of the second screen **160**, to prevent the second screen **160** from being separated from the second connecting base **140** in a vertical direction VD.

Specifically, an extended length L of the second guide wall **142** relative to the hinge module **120** is greater than an extended length L of the second limiting wall **143** relative to the hinge module **120**. Referring to FIG. 2C, in the present embodiment, the second limiting wall **143** is formed on one side of the second connecting base **140** close to the host **110** and the second guide wall **142** is formed on one side of the

second connecting base **140** away from the host **110**, and a mounting direction of the second screen **160** is from the host **110** to the outside.

Referring to FIG. 2E, in another embodiment, the second limiting wall **143a** is formed on one side of the second connecting base **140a** away from the host **110a** and the second guide wall **142a** is formed on one side of the second connecting base **140a** close to the host **110a**, and a mounting direction of the second screen **160** is from the outside to the host **110a**.

Referring to FIG. 2A to FIG. 2D, the electronic device with multi screens **100** includes a stroke guide structure **170**, including a limiting column **171** and a fan-shaped guide groove **172**, respectively disposed on a surface corresponding to the first connecting base **130** and the second connecting base **140**. In the present embodiment, the limiting column **171** is formed on the first connecting base **130** and the fan-shaped guide groove **172** is formed on the second connecting base **140**. The limiting column **171** slidably penetrates the fan-shaped guide groove **172**. When the first connecting base **130** and the second connecting base **140** are aligned with each other, the limiting column **171** abuts against a second end E2 of the fan-shaped guide groove **172** close to the host **110**. When the first connecting base **130** and the second connecting base **140** are separated from each other, the limiting column **171** is separated from the second end E2 of the fan-shaped guide groove **172** and slides toward a first end E1 of the fan-shaped guide groove **172**, until the limiting column **171** abuts against the first end E1 (which is a maximum rotating angle of the second connecting base **140** relative to the first connecting base **130**). Further, through the abutting of the fan-shaped guide groove **172** and the limiting column **171**, the rotating angle of the second connecting base **140** relative to the first connecting base **130** is limited.

FIG. 3A is a schematic action diagram of a locking structure of the electronic device with multi screens in FIG. 2A locking a first screen and a second screen. FIG. 3B is a schematic action diagram of the locking structure of the electronic device with multi screens in FIG. 3A being unlocked on the first screen and the second screen.

Referring to FIG. 3A and FIG. 3B, the electronic device with multi screens **100** includes a locking structure **180**, slidably disposed in the second screen **160**. When the first screen **150** and the second screen **160** are flush with each other, the locking structure **180** is suitable for sliding toward the first screen **150** automatically or manually to lock the first screen **150** and the second screen **160**. In this case, the first screen **150** and the second screen **160** are connected integrally, and no matter which screen (the first screen **150** or the second screen **160**) a force is applied to, both the first screen **150** and the second screen **160** rotate synchronously relative to the host **110**.

Further, the locking structure **180** includes a locking block **181**, a toggle block **182**, a first magnet **183**, a second magnet **184**, and a third magnet **185**. The locking block **181** is slidably disposed in the second screen **160** and is suitable for penetrating the first screen **150**. The toggle block **182** is vertically disposed on one end of the locking block **181** away from the first screen **150** and extends upward beyond the second screen **160**, and the toggle block **182** is configured to be manually adjusted by a user. The first magnet **183**, the second magnet **184**, and third magnet **185** are respectively disposed on the first screen **150**, the second screen **160**, and the locking block **181**.

Referring to FIG. 3A, when the first magnet **183** and the third magnet **185** are attracted to each other, the locking

block **181** is driven to penetrate the first screen **150**, so that the first screen **150** and the second screen **160** lock each other. Referring to FIG. **3B**, when the second magnet **184** and the third magnet **185** are attracted to each other, the locking block **181** is driven away from the first screen **150**, so that the first screen **150** and the second screen **160** do not lock each other.

In other embodiments, the locking structure is, for example, disposed in the hinge module and suitable for locking the second connecting base, so that the second connecting base cannot rotate relative to the first connecting base, to achieve the objective of locking the first screen and the second screen.

FIG. **3C** is a schematic action diagram of the locking structure of the electronic device with multi screens in FIG. **2A** locking a hinge module and a second connecting base. FIG. **3D** is a schematic action diagram of the locking structure of the electronic device with multi screens in FIG. **3C** being unlocked on the hinge module and the second connecting base.

Referring to FIG. **3C** and FIG. **3D**, the electronic device with multi screens **100** includes a locking structure **180a**, slidably disposed in the support portion **121** of the hinge module **120**. When the first connecting base **130** and the second connecting base **140** are aligned with each other, the locking structure **180a** is suitable for sliding toward the second connecting base **140** automatically or manually to lock the support portion **121** and the second connecting base **140**. In this case, the first connecting base **130** and the second connecting base **140** are connected integrally, and no matter which screen (the first screen **150** or the second screen **160**) a force is applied to, both the first screen **150** and the second screen **160** synchronously drive the first connecting base **130** and the second connecting base **140** to rotate relative to the host **110**.

The locking structure **180a** includes a locking block **181a**, a toggle block **182a**, a first magnet **183a**, a second magnet **184a**, and a third magnet **185a**. The locking block **181a** is slidably disposed in the support portion **121** and is suitable for penetrating the second connecting base **140a**. The toggle block **182a** is vertically disposed on one end of the locking block **181a** away from the second connecting base **140** and extends beyond the support portion **121**, and the toggle block **182a** is configured to be manually adjusted by a user. The first magnet **183a**, the second magnet **184a**, and third magnet **185a** are respectively disposed on the support portion **121**, the second connecting base **140**, and the locking block **181a**.

Referring to FIG. **3D**, when the first magnet **183a** and the third magnet **185a** are attracted to each other, the locking block **181a** is driven to penetrate the second connecting base **140**, so that the support portion **121** and the second connecting base **140** lock each other. Referring to FIG. **3C**, when the second magnet **184a** and the third magnet **185a** are attracted to each other, the locking block **181a** is driven away from the second connecting base **140**, so that the support portion **121** and the second connecting base **140** do not lock each other.

FIG. **3E** is a schematic planar diagram of the electronic device with multi screens in FIG. **1A** adopting a plurality of positioning magnets.

Referring to FIG. **1A** and FIG. **3E**, when the first screen **150** and the second screen **160** switch to the synchronous display mode, the second connecting base **140** is suitable for rotating relative to the hinge module **120** to be aligned with the first connecting base **130**, so that the first screen **150** and the second screen **160** are flush with each other, and a first

display surface **DS1** of the first screen **150** and a second display surface **DS2** of the second screen **160** are located on a same plane. The electronic device with multi screens **100** further includes a plurality of positioning magnets **190**, respectively disposed on two opposite sides of the first screen **150** and the second screen **160**, and the plurality of corresponding positioning magnets **190** are attracted to each other magnetically, so that the first screen **150** and the second screen **160** may be connected stably, to prevent the first display surface **DS1** and the second display surface **DS2** from generating a height difference due to external factors.

FIG. **1D** is a schematic top view of a combination mode of an electronic device with multi screens according to another embodiment of the invention. Referring to FIG. **1D**, a difference of the electronic device with multi screens **100B** in the present embodiment from the electronic device with multi screens **100** in FIG. **1A** lies in: The electronic device with multi screens **100B** includes an integrally formed connecting base **130b**, fixed on a hinge module **120b**. A first screen **150b** is slidably disposed in the connecting base **130b** and includes a first display surface **DS1**. A second screen **160b** is detachably disposed in the connecting base **130b** and includes a second display surface **DS2**. The first screen **150b** and the second screen **160b** are flush with each other, and the first display surface **DS1** and the second display surface **DS2** are located on a same plane.

FIG. **4A** is a schematic top view of the electronic device with multi screens in FIG. **1A** discounting the second screen. FIG. **4B** is a schematic top view of a first screen of the electronic device with multi screens in FIG. **1A** being clamped between a first connecting base and a second connecting base. FIG. **4C** is a partial schematic enlarged three-dimensional view of the electronic device with multi screens in FIG. **4B**.

Referring to FIG. **1C**, and FIG. **4A** to FIG. **4C**, the following describes the process of the electronic device with multi screens **100** in the present embodiment switching to a single screen. When the second clamping portion **161** of the second screen **160** is separated from the second groove **G2** of the second connecting base **140**, the first clamping portion **151** of the first screen **150** is suitable for sliding relative to the first connecting base **130** to be clamped in the first groove **G1** of the first connecting base **130** and the second groove **G2** of the second connecting base **140**, so that two sides of the first screen **150** are aligned with two sides of the host **110**. In this case, the electronic device with multi screens **100** is the same as a general single-screen notebook computer, and is easy to carry.

Besides, when the second screen **160** is separated from the second connecting base **140**, an expansion member (not shown in the figure) is suitable for being connected to the second clamping portion **161** (the second clamping portion **161** is provided with a wireless transmission module, a power supply port, or an audio signal port) of the second screen **160**. Therefore, the expansion member includes a battery, a loudspeaker, or a support frame. Accordingly, the second screen **160** is converted into a tablet computer used independently.

Based on the above, the electronic device with multi screens of the invention includes the first screen and the second screen that may be aligned with each other and separated from each other, so that when being aligned with each other, the first screen and the second screen may be displayed in combination to increase the display range of a single visual angle, and when being separated from each other, the first screen and the second screen may be respectively displayed in different visual angles to be applicable to

situations of discussions of a plurality of persons. Further, the first connecting base and the second connecting base are disposed on two sides of the hinge module, so that the first screen and the second screen are located at the center of the host. In this way, disadvantages of causing a center-of-gravity shift and deviating a visual angle from the center can be avoided. Therefore, the electronic device with multi screens of the invention more conforms to ergonomics.

What is claimed is:

1. An electronic device with multi screens, comprising:
  - a host;
  - a hinge module, pivotally connected to the host and rotating along a first axial direction;
  - a first connecting base, fixed on a first side of the hinge module;
  - a second connecting base, pivotally connected to a second side of the hinge module and rotating along a second axial direction parallel to the first axial direction, wherein the second connecting base is adjacent to the first connecting base;
  - a first screen, slidably disposed in the first connecting base and the second connecting base; and
  - a second screen, detachably disposed in the second connecting base, wherein the second connecting base is suitable for rotating relative to the hinge module to be aligned with or separated from the first connecting base, when the first connecting base and the second connecting base are aligned with each other, the first screen and the second screen are flush with each other, and when the first connecting base and the second connecting base are separated from each other, the first screen and the second screen have an included angle therebetween.
2. The electronic device with multi screens according to claim 1, wherein the hinge module has a support portion, a first rotating shaft portion, and a pivot portion, the first rotating shaft portion is disposed on one side of the support portion facing the host and is located in a rotating groove of the host, and the pivot portion is disposed on the support portion and is spaced from the first connecting base.
3. The electronic device with multi screens according to claim 2, wherein the two connecting bases have a second rotating shaft portion and a lower curved surface, the second rotating shaft portion is pivotally connected to the pivot portion, and the lower curved surface partially accommodates the pivot portion.
4. The electronic device with multi screens according to claim 1, wherein the first connecting base has a first guide wall, a first limiting wall, and a first groove, the first groove is formed between the first guide wall and the first limiting wall, the first screen has a first clamping portion, a first guide surface, and a first limiting surface, the first clamping portion is clamped in the first groove, and the first guide surface and the first limiting surface respectively abut against the first guide wall and the first limiting wall.
5. The electronic device with multi screens according to claim 4, wherein an extended length of the first guide wall relative to the hinge module is greater than an extended length of the first limiting wall relative to the hinge module.
6. The electronic device with multi screens according to claim 4, wherein the first connecting base has a plurality of first protrusions, respectively formed on the first guide wall and the first limiting wall and located in the first groove, and each of the first protrusions interferes with and limits the first clamping portion.
7. The electronic device with multi screens according to claim 4, wherein the first limiting wall is formed on one side

of the first connecting base close to the host and the first guide wall is formed on one side of the first connecting base away from the host, or the first limiting wall is formed on one side of the first connecting base away from the host and the first guide wall is formed on one side of the first connecting base close to the host.

8. The electronic device with multi screens according to claim 1, wherein the second connecting base has a second guide wall, a second limiting wall, and a second groove, the second groove is formed between the second guide wall and the second limiting wall, the second screen has a second clamping portion, a second guide surface, and a second limiting surface, the second clamping portion is clamped in the second groove, and the second guide surface and the second limiting surface respectively abut against the second guide wall and the second limiting wall.

9. The electronic device with multi screens according to claim 8, wherein an extended length of the second guide wall relative to the hinge module is greater than an extended length of the second limiting wall relative to the hinge module.

10. The electronic device with multi screens according to claim 8, wherein the second connecting base has a plurality of second protrusions, respectively formed on the second guide wall and the second limiting wall and located in the second groove, and each of the second protrusions interferes with and limits the second clamping portion.

11. The electronic device with multi screens according to claim 8, wherein the second limiting wall is formed on one side of the second connecting base close to the host and the second guide wall is formed on one side of the second connecting base away from the host, or the second limiting wall is formed on one side of the first connecting base away from the host and the second guide wall is formed on one side of the second connecting base close to the host.

12. The electronic device with multi screens according to claim 1, further comprising a locking structure, slidably disposed in the second screen, wherein when the first screen and the second screen are flush with each other, the locking structure is suitable for sliding toward the first screen to lock the first screen and the second screen.

13. The electronic device with multi screens according to claim 12, wherein the locking structure has a locking block and a toggle block, the locking block is suitable for penetrating the first screen, and the toggle block is vertically disposed on one end of the locking block away from the first screen and extends upward beyond the second screen.

14. The electronic device with multi screens according to claim 13, wherein the locking structure has a first magnet, a second magnet, and a third magnet, respectively disposed on the first screen, the second screen, and the locking block, when the first magnet and the third magnet are attracted to each other, the locking block is driven to penetrate the first screen, so that the first screen and the second screen lock each other, and when the second magnet and the third magnet are attracted to each other, the locking block is driven away from the first screen, so that the first screen and the second screen do not lock each other.

15. The electronic device with multi screens according to claim 2, further comprising a locking structure, slidably disposed in the support portion, wherein when the first connecting base and the second connecting base are aligned with each other, the locking structure is suitable for sliding toward the second connecting base to lock the support portion of the hinge module and the second connecting base.

16. The electronic device with multi screens according to claim 15, wherein the locking structure has a locking block

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and a toggle block, the locking block is suitable for penetrating the second connecting base, and the toggle block is vertically disposed on one end of the locking block away from the second connecting base and extends beyond the support portion.

17. The electronic device with multi screens according to claim 16, wherein the locking structure comprises a first magnet, a second magnet, and a third magnet, respectively disposed on the support portion, the second connecting base, and the locking block, when the first magnet and the third magnet are attracted to each other, the locking block is driven to penetrate the second connecting base, so that the support portion and the second connecting base lock each other, and when the second magnet and the third magnet are attracted to each other, the locking block is driven away from the second connecting base, so that the support portion and the second connecting base do not lock each other.

18. The electronic device with multi screens according to claim 1, further comprising a stroke guide structure, having a limiting column and a fan-shaped guide groove, respectively disposed on a surface corresponding to the first connecting base and the second connecting base, wherein the limiting column slidably penetrates the fan-shaped guide groove, when the first connecting base and the second connecting base are aligned with each other, the limiting column abuts against a second end of the fan-shaped guide groove, and when the first connecting base and the second connecting base are separated from each other, the limiting column slides toward a first end of the fan-shaped guide groove.

19. The electronic device with multi screens according to claim 1, wherein when the second screen is separated from the second connecting base, the first screen is suitable for sliding relative to the first connecting base to be clamped in the first connecting base and the second connecting base, so that two sides of the first screen are aligned with two sides of the host.

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20. The electronic device with multi screens according to claim 1, wherein when the second screen is separated from the second connecting base, an expansion member is suitable for being connected to the second screen, and the expansion member comprises a battery, a loudspeaker, or a support frame.

21. An electronic device with multi screens, comprising:  
 a host;  
 a hinge module, pivotally connected to the host and rotating along a first axial direction;  
 a first connecting base, fixed on a first side of the hinge module;  
 a second connecting base, pivotally connected to a second side of the hinge module and rotating along a second axial direction parallel to the first axial direction, wherein the second connecting base is adjacent to the first connecting base;  
 a first screen, slidably disposed in the first connecting base and the second connecting base and having a first display surface; and  
 a second screen, detachably disposed in the second connecting base and having a second display surface, wherein the second connecting base is suitable for rotating relative to the hinge module to be aligned with the first connecting base, so that the first screen and the second screen are flush with each other, and the first display surface and the second display surface are located on a same plane.

22. The electronic device with multi screens according to claim 21, further comprising a plurality of positioning magnets, respectively disposed on two opposite sides of the first screen and the second screen, wherein the corresponding positioning magnets are magnetically attracted to each other.

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